

Overview of European Smart Grids Initiatives

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**Nikos Hatziargyriou, NTUA,
Vice-chairman ETP SmartGrids**

www.smartgrids.eu

e-mail: nh@power.ece.ntua.gr



What is a SmartGrid?

Definition by SG ETP in 2009

What is a SmartGrid?



A SmartGrid is an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.

A SmartGrid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- better facilitate the connection and operation of generators of all sizes and technologies;
- allow consumers to play a part in optimizing the operation of the system;
- provide consumers with greater information and choice of supply;
- significantly reduce the environmental impact of the whole electricity supply system;
- deliver enhanced levels of reliability and security of supply.

SmartGrids deployment must include not only technology, market and commercial considerations, environmental impact, regulatory framework, standardization usage, ICT (Information & Communication Technology) and migration strategy but also societal requirements and governmental edicts.



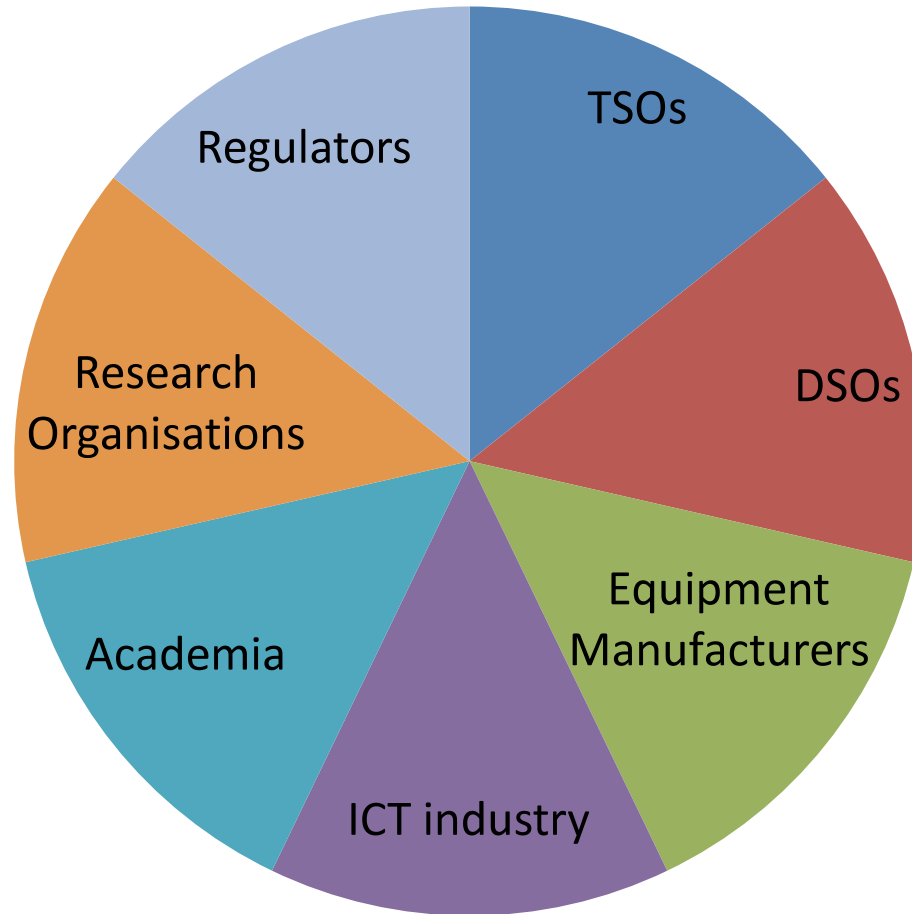
What is an ETP?

- ❑ An Industry-led stakeholder forum charged with defining research priorities in a broad range of technological areas
 - provides an independent framework
 - to define agendas, priorities, and action plans
 - for research and technological developments
 - in areas where Europe requires major advances
 - in the medium to long term.
- ❑ An ETP is also to:
 - provide input to European and National research funding schemes.
 - foster effective public-private partnerships,
 - contribute to development of a European Research Area



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New ETP SG Steering Committee Stakeholders represented





2006/2007: EU SmartGrids Activities

□ **2006: EU SmartGrids TP, SmartGrids Vision**

□ **2007: 1st SRA (Strategic Research Agenda)**

SRA 2035 is an update of this SRA 2007

□ **Nov 2007: SET (Strategic Energy Technology)
Plan**

- Initiatives: Wind, Solar, EEGI, Bio-energy, CO2 capture, transport and storage, JTI on fuel cells and hydrogen, Smart Cities
 - EERA (European Alliance of SmartGrids laboratories)
 - **JRC**: Joint Research Center
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The SmartGrids TP Vision



<http://www.smartgrids.eu>



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SET- PLAN

The SET-Plan establishes an energy technology policy for Europe. It comprises measures relating to planning, implementation, resources and international cooperation in the field of energy technology.

The SET-Plan has two major timelines:

For **2020**, the SET-Plan provides a framework to accelerate the development and deployment of cost-effective low carbon technologies. With such comprehensive strategies, the EU is on track to reach its 20-20-20 goals of a 20% reduction of CO₂ emissions, a 20% share of energy from low-carbon energy sources and 20% reduction in the use of primary energy by improving energy efficiency by 2020.

For **2050**, the SET-Plan is targeted at limiting climate change to a global temperature rise of no more than 2°C, in particular by matching the vision to reduce EU greenhouse gas emissions by 80 - 95%. The SET-Plan objective in this regard is to further lower the cost of low-carbon energy and put the EU's energy industry at the forefront of the rapidly growing low-carbon energy technology sector.



2008/2009: EU SmartGrids Activities

S M A R T G R I D S

□ **2008: SmartGrids ERA-Net (Cooperation and Coordination of Research Activities carried out at National or Regional Level)**

➤ **20 National SmartGrids Program managers cooperate for better SmartGrids research**

□ **2009: SDD (Strategic Deployment Document) by SG ETP**

- 1st SmartGrids Strategic Deployment Document
 - Follow-Up was **EEGI** (European Electricity Grid Initiative) as part of SET Plan
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2009/2010: EU SmartGrids Activities

- ❑ **2009: New SmartGrids European Technology Platform (ETP)**
 - ❑ **June 2010: ETP SmartGrids and IEEE organised the “SmartGrid World Forum”**
 - ❑ **2010: EC sets up the Task Force on SmartGrids**
 - ✓ Reference Group for SG Standards,
 - ✓ Expert Group for Regulatory Recommendations for Privacy,
 - ✓ Data Protection and cyber-security in the SG Environment,
 - ✓ Expert Group for Regulatory Recommendations for SG Deployment,
 - ✓ Expert Group for SG Infrastructure Deployment,
 - ✓ Industrial Policy for Smart Grids
-



2010/2011: EU SmartGrids Activities

□ 2010: EEGI (European Electricity Grid Initiative)

- Roadmap for SmartGrids Demonstration for 2020
- ETP SG - Stakeholder based review process

□ 2010: CEN, CENELEC and ETSI

- Smart Meters Coordination Group (M/441)
- Joint Working Group on standards for the SG (M/490)

□ 2011&2012 Update of SmartGrids SRA 2035

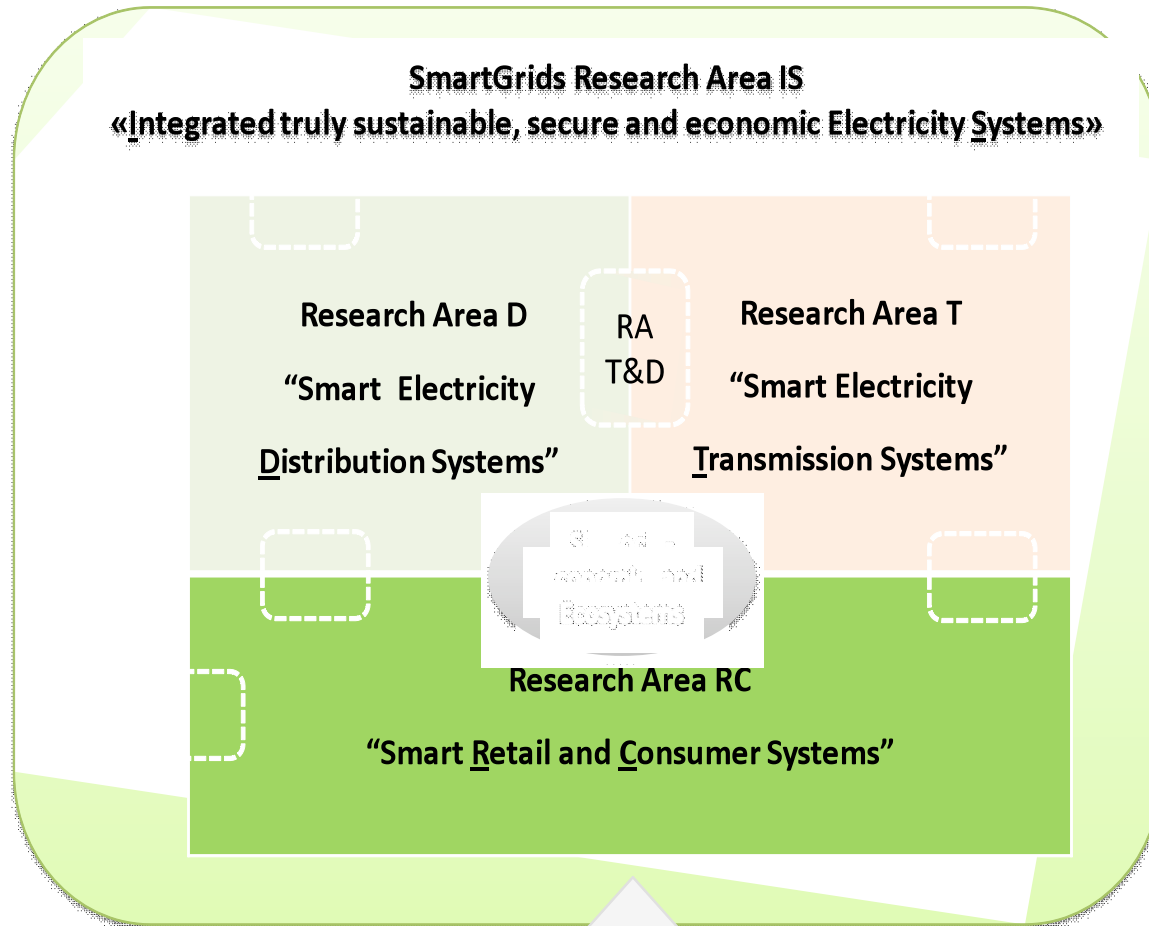
starting point: SG Technology Push and SG Market Pull

□ 2013 New ETP on SmartGrids



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SmartGrids SRA 2035



Other research areas contributing to the SmartGrids SRA 2035:
European Energy Platforms for Wind, PV, CSP, CCS, Bio-Energy,
Fuel Cells, Hydrogen, SmartCities, Nuclear Fission



March 2012 – Adoption of SRA 2035 in Rome

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□ 2011-2020

2011

SRA 2007 was input to EEGI: European Electricity Grid Initiative (initiated by Grid Operators)

Goal EEGI: Demonstration SmartGrids 2020

□ 2020-2035

SRA 2035 is input to the future European Research Program Definition

2020

– The definition of research areas, tasks, topics to be solved starting today ...

... for the needs of the energy/electricity system and its stakeholders by 2035

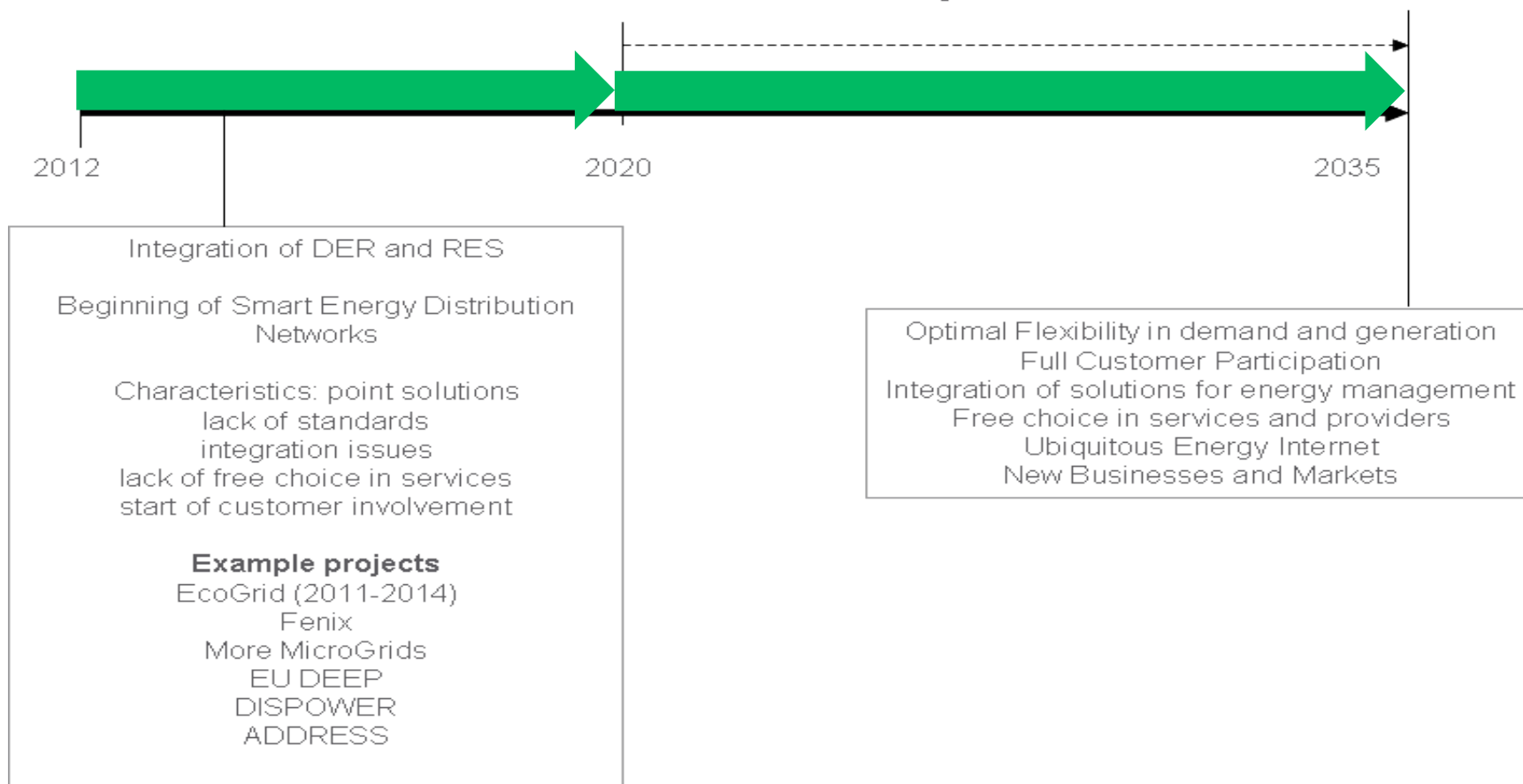
2035



What are the expected fundamental changes between 2020 and 2035 for SmartGrids?

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Transition to optimal Smart Energy System
with optimal flexibility in demand and
generation





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Expected Externalities 2035+

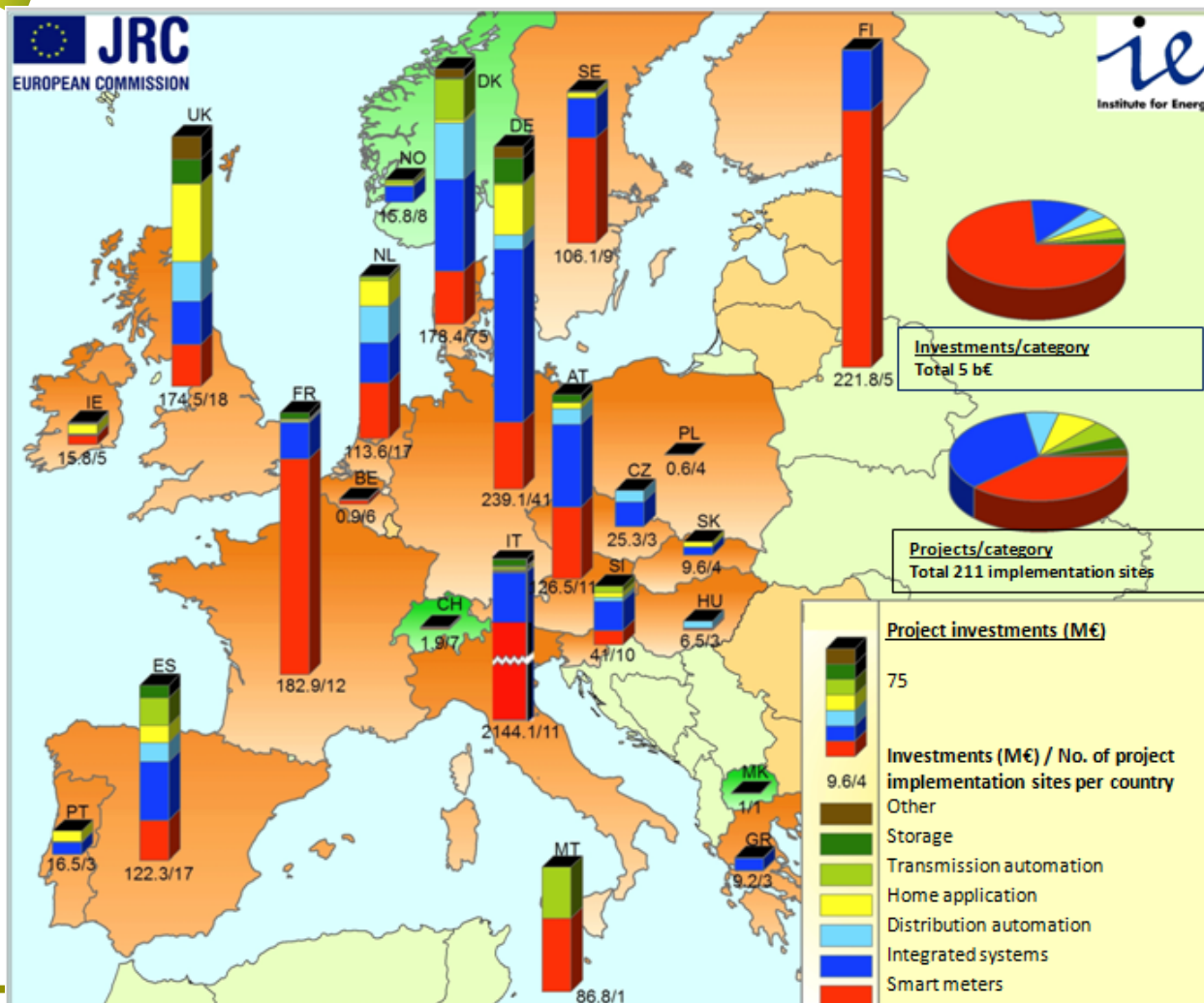
- ☐ Reduced greenhouse gas emissions by the energy sector 2050 by over 80%
 - ☐ Decreased energy demand by 41% by 2050 as compared to 2006
 - ☐ RES shares achieve at least 55% in gross final energy consumption by 2050
 - ☐ RES shares in electricity consumption reach between 64% to 97%.
 - ☐ Electricity could provide around 65% of energy demand by passenger cars and light duty vehicles
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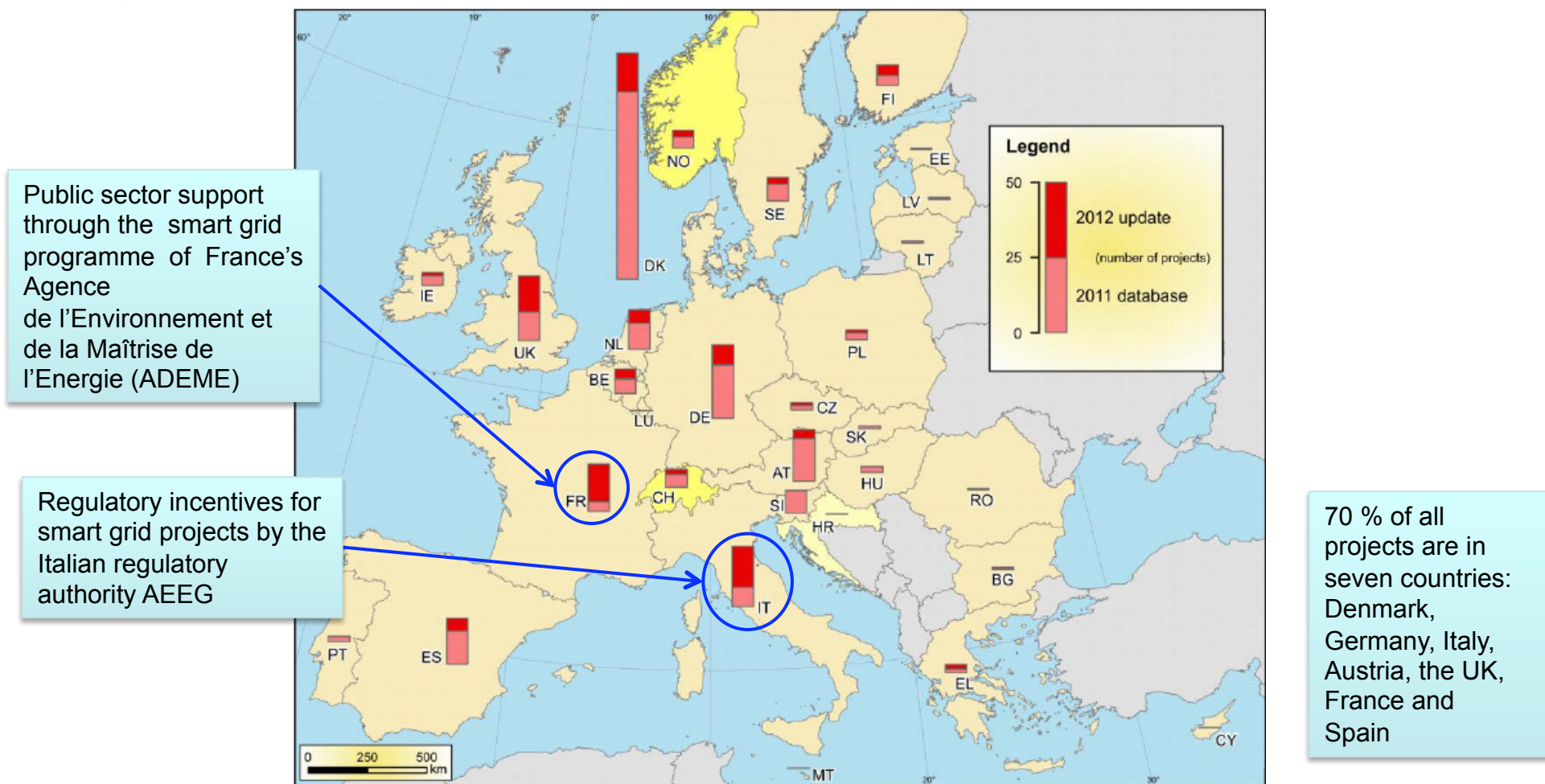
SmartGrids projects in Europe by July 2011

at total investment of 0,5 b€ (source JRC)



- July 2011: 219 projects (195 SmartGrids, 24 Smartmeter projects) in EU 27, Switzerland and Norway
- 2012: 281 SmartGrids RD&D projects and 90 Smartmeter projects. Total investment: 1,8 b €. (average budget/project 6.5 m€, average duration 35 months).

Geographical distribution of SG projects (source JRC)



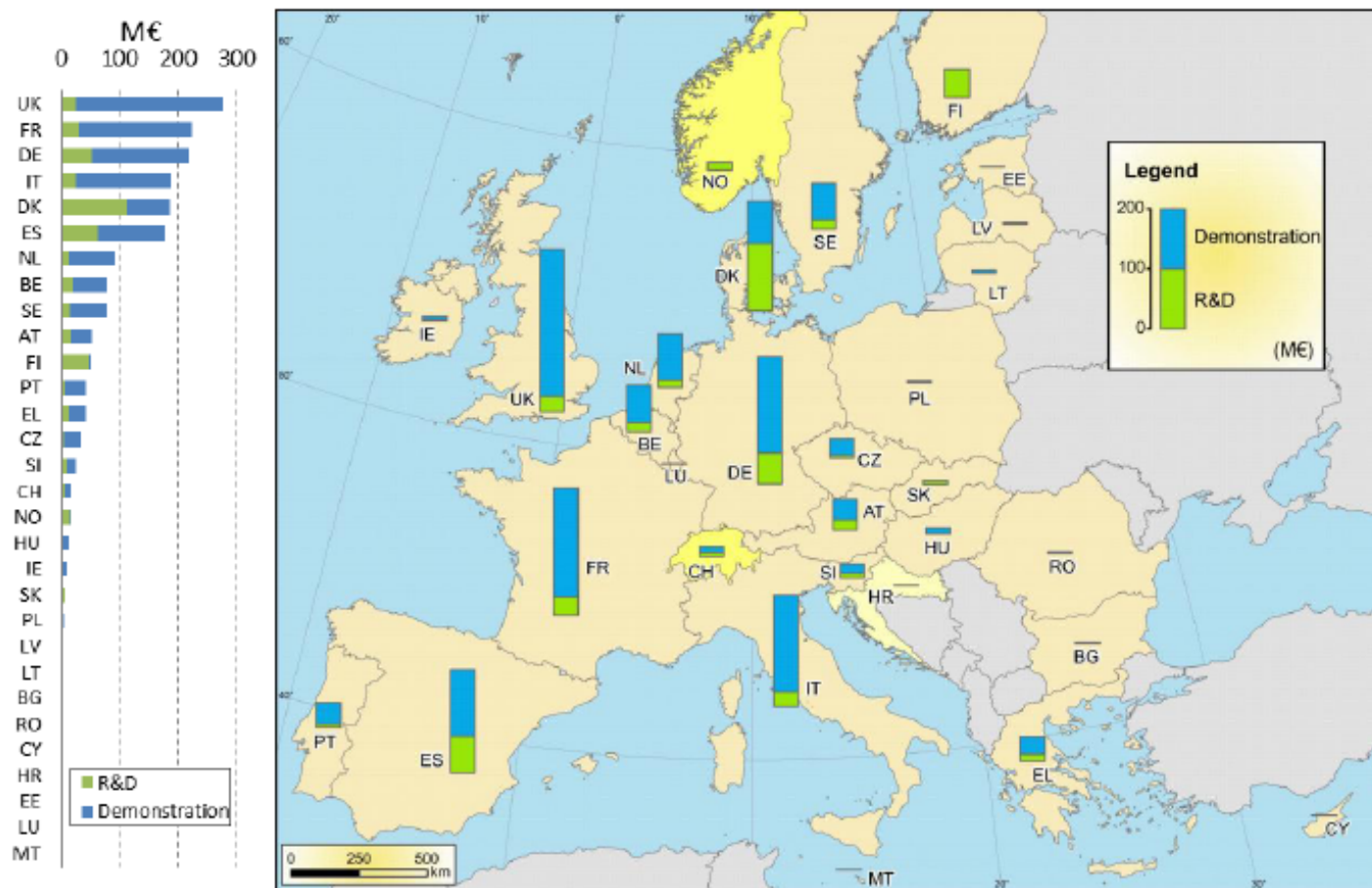
Italy and France each have 14 new smart grid projects (which started in 2010-12) in addition to four and six respectively last year.



Investments in RD&D SG projects (1/2)

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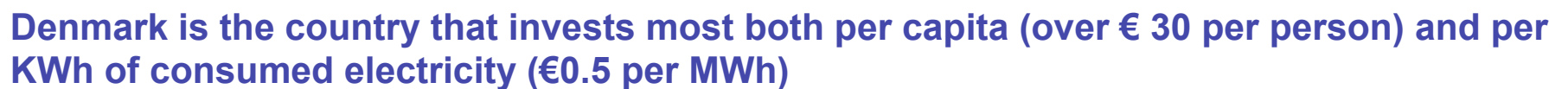
(source JRC)



UK~15%
Germany~12%
France~12%
Italy~10%
Denmark~10%
Spain~10%

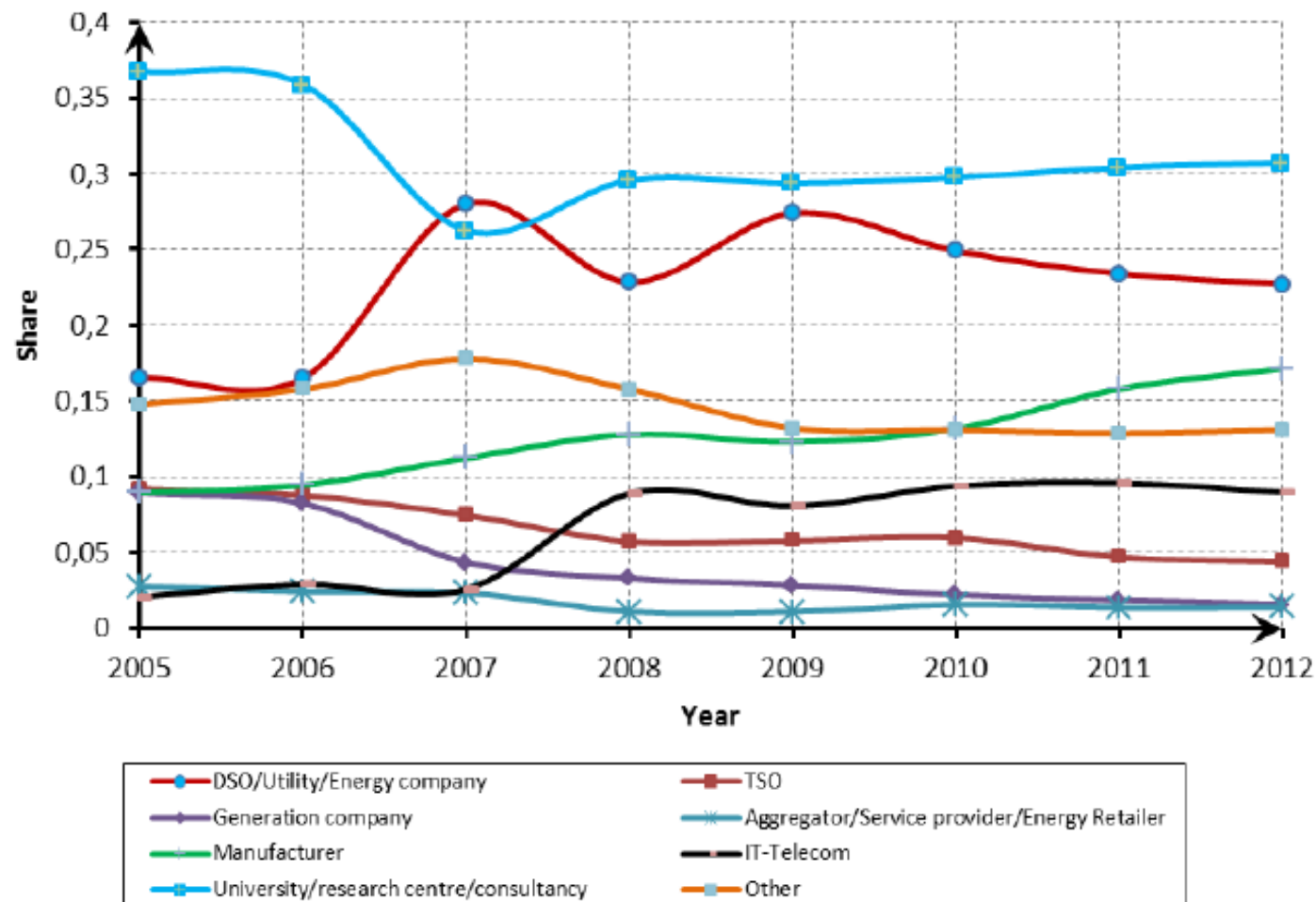


(source JRC)





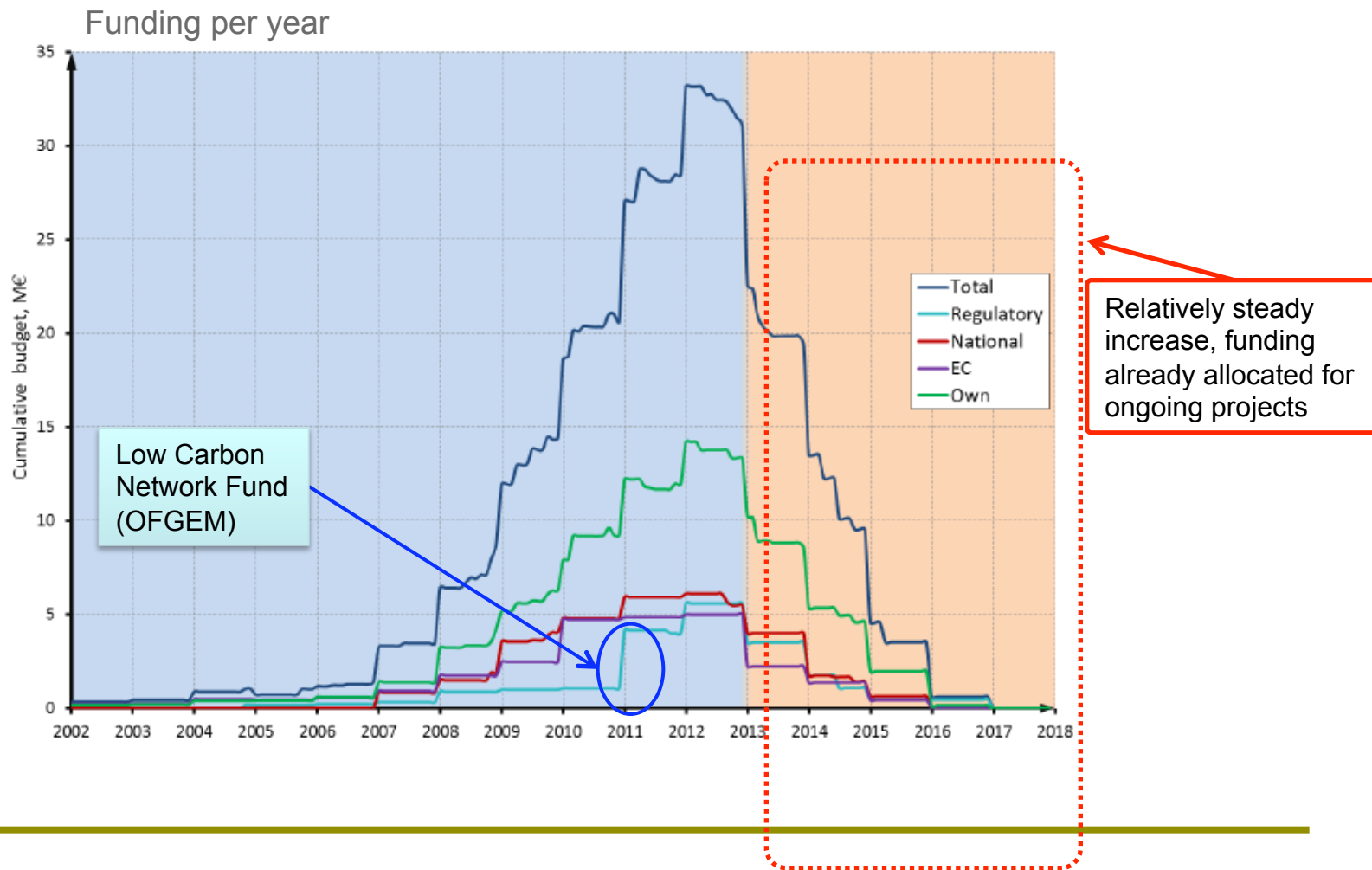
Share of participation by organisation type (weighted with the budget) *(source JRC)*





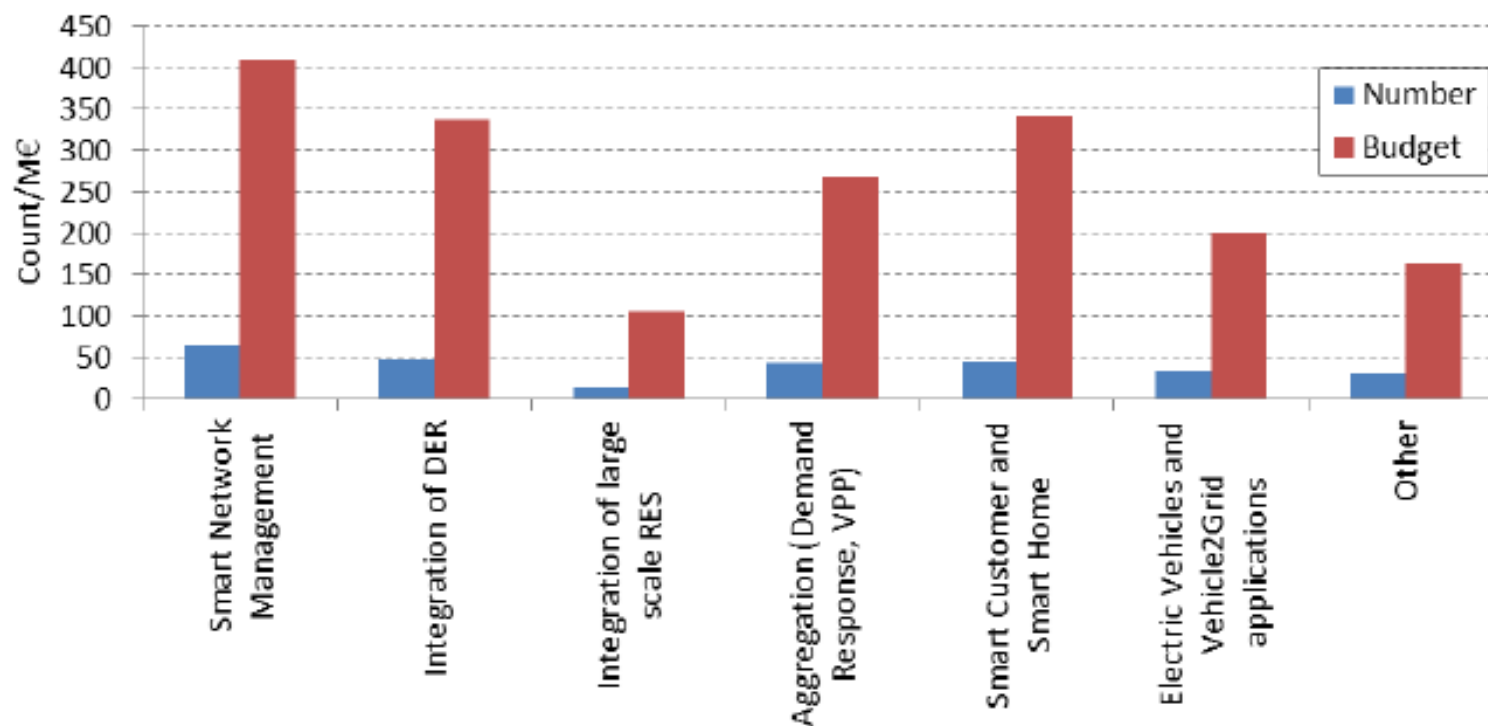
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Allocated funding over lifespan of SG projects *(source JRC)*





Smartgrid applications targeted (source JRC)



**Microgrids, the building blocks of Smartgrids,
encompass all SG applications!**